4 A Tour of the Cell

Chapter Objectives

Introduction Explain why art is so important to an understanding of biology.

Introduction to the Cell

4.1 Compare the designs of and images produced by a light microscope, a scanning electron microscope, and a transmission electron microscope. Distinguish between magnification and resolving power.

4.1 Define cell theory and briefly describe the discoveries that led to its development.

4.2 Explain why there are upper and lower limits to cell size.

4.3–4.4 Distinguish between the structures of prokaryotic and eukaryotic cells.

4.4 Explain why compartmentalization is important in eukaryotic cells.

4.4 Compare the structures of plant and animal cells. Note the function of each cell part.

Organelles of the Endomembrane System

4.5–4.10,

4.12–4.13 Describe the structure and functions of the nucleus, endomembrane system, smooth and rough endoplasmic reticulums, Golgi apparatus, lysosomes, and vacuoles.

4.11 Explain how impaired lysosomal function can cause the symptoms of storage diseases.

Energy-Converting Organelles

4.14–4.15 Compare the structures and functions of chloroplasts and mitochondria.

The Cytoskeleton and Related Structures

4.16 Compare the structures and functions of microfilaments, intermediate filaments, and microtubules.

4.17 Explain how the structure of cilia and flagella relate to their functions.

Cell Surfaces and Junctions

4.18 Compare the structures and functions of cell surfaces and intercellular junctions of plant and animal cells.

Functional Categories of Organelles

4.19 Describe the four functional categories of eukaryotic organelles, noting which organelles are in each group.

4.19 Describe the three fundamental features of all life forms on our planet.